## INORGANIC CHEMICAL ANALYSES OF GROUND - WATER SAMPLES

Table 1. Inorganic Chemical Analyses - Shallow Overburden Wells

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)									Total	Total	Total Dissolved	Specific Conductance	
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (as CaCO <sub>3</sub> )	Sulphate (SO <sub>4</sub> )	Chloride (CI)	Fluoride (F)	Nitrate ( NO2 + NO3 as N )	Alkalinity (as mg/L CaCO <sub>3</sub> )	Hardness Dissolved ( as mg/L Solids CaCO3 ) (mg/L)	Solids	in Lab (µ mho/cm at 25° C)
365	5/9/61	7.6	0.16	-	-	_	-	-	-	4	-	-	196	188	-	320
479	-	7.5	2.60	-	-	_	-	-	-	17	-	5.0	193	184	-	-
553	_	7.7	0.25	-	-	-	-	-	-	5	-	0.07	197	314		-
1339	25/7/79	7.3	<.05	99	33	11	2.7	324	56	13	0.1	1.6	324	384	480	715
4257	-	7.4	0.19	-	-	-	-	-	-	57	-	0.40	370	472	-	-
4577	-	8.1	0.14	-	-	-	-	-	-	28	-	14.0	183	322	-	-
5230	4/8/66	6.7	0.48	604	-	542	-	-	90	111	-	0.23	496	870	-	-
5282	28/6/77	7.6	0.10	86	20	6	5.1	231	39	13	0.1	8.9	231	296	407	578
5312	28/7/77	7.9	0.60	39	24	13	1.7	219	1	2	0.2	<0.1	219	196	254	390
5805	20/6/79	7.8	0.62	69	28	34	2.1	258	26	33	0.2	8	258	276	360	610
6400	4/7/79	7.8	0.70	60	18	7	1.1	229	7	1	0.1	<0.1	229	222	280	430
6637	28/6/77	8.3	0.15	107	18	3	0.8	224	29	59	0.1	4.2	224	343	473	663
6847	18/7/79	7.5	0.10	90	17	51	2.5	209	52	63	0.3	14	209	292	555	775
8321	28/6/77	8.0	<0.10	83	11	2	0.9	217	28	8	0.1	1.6	217	253	323	471
9609	4/7/79	7.6	0.45	90	5	6	3.8	191	52	9	0.1	0.5	191	244	335	495
9997	8/8/78	7.4	<0.05	117	12	5	1.6	260	67	8	0.1	1.7	260	340	490	590
10548	26/9/78	7.7	-	-	-	-		-	38	37	-	3.1	-	332	430	610
10560	8/8/78	7.9	< 0.05	69	18	4	1.5	206	42	2	0.1	0.5	206	246	290	445
10563	8/8/78	7.0	0.11	187	14	10	3.6	354	43	25	<0.1	29	354	524	860	960
10564	8/8/78	7.5	<0.05	134	12	4	1.1	254	79	12	<0.1	9.6	254	384	545	690
11986	25/7/79	7.7	0.36	54	15	5	1.8	196	13	<0.1	0.1	0.1	196	196	245	378
12550	18/7/79	7.8	1.21	46	20	14	1.2	222	2	. 5	0.1	<0.1	222	198	270	414
12634	18/7/79	7.3	<0.05	126	17	7	1.2	317	17	20	<0.1	0.7	317	384	455	700
99990	18/7/79	7.7	<0.05	67	22	3	1.0	227	35	2	0.1	0.1	227	257	295	476

Table 2. Inorganic Chemical Analyses - Deep Overburden Wells

Sample	Sampling	pH	Constituents in milligrams per litre (mg/L)								Total	Total		Specific Conductance		
Number	Date	in Lab	Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (as CaCO <sub>3</sub> )	Sulphate (SO <sub>4</sub> )	Chloride (CI)	Fluoride (F)	Nitrate ( NO <sub>2</sub> + NO <sub>3</sub> as N )	Alkalinity (as mg/L CaCO <sub>3</sub> )	Hardness ( as mg/L CaCO <sub>3</sub> )		in Lab ( µ mho/cm at 25° C )
94	-	7.5	0.75	-	-	-	-	-	-	36	-	1.25	203	380	-	-
146	18/7/79	7.8	0.14	59	15	2	0.9	161	33	13	0.1	0.6	161	208	260	403
225	-	7.9	0.32	-	-	-	-	-	-	8	-	0.12	213	174	-	-
495	5/12/62	7.6	0.22	-	-	-	-	-	8	549	-	-	112	380	-	-
521	5/12/62	7.7	0.10	-	-	-	-	-	0	394	-	-	108	354	-	-
525	-	7.9	0.48	-	-	-	-	-	-	5	-	0.03	208	106	-	-
535	4/7/79	7.8	0.06	60	12	10	1.1	197	20	2	0.1	0.3	197	200	265	405
1265	25/7/79	7.4	1.18	96	21	6	1.1	269	26	7	0.1	8.6	269	326	425	610
2565	4/7/79	7.8	0.26	34	14	72	8.6	262	1	34	0.4	<0.1	262	142	330	580
3574	18/12/62	7.6	0.00	-	-	-	-	-	72	259	-	-	342	676	-	-
3663	4/7/79	7.2	0.05	157	37	26	6.0	377	99	63	0.1	11	377	544	785	1100
3880	4/7/79	8.4	0.10	9	4	57	0.7	112	4	36	0.5	<0.1	113	40	210	325
4091	22/6/77	8.3	0.25	115	16	15	1.2	273	50	26	0.1	7.7	273	355	485	685
4200	24/11/66	7.8	2.0	39	29	110	-	-	5	151	-	-	254	220	-	-
4214	14/6/65	7.5	4.3	-	-	-	-	-	-	53	0.2	-	467	378	-	-
4221	14/6/65	7.5	3.5	-	-	_	-	-	-	58	0.2	-	455	390	-	-
4224	7/7/58	7.9	3.4	_	_	-	_	_	-	32	-	-	418	372	-	-
4235	-	7.2	1.43	_	_	_	_		_	50	_	0.15	197	84	-	_
4282	_	8.5	0.15	_	_	_	_	_	1	15	_	0.00	274	224	-	-
	_	8.3	2.50	_	_	_	_	_	1	18	_	0.91	186	154	_	-
4287	12/10/72	7.9	0.65	28	_	66	_	_	-	-	_	-	-	-	-	-
4304	-	7.8	0.00	-	_	-	_	_	5	2	_	0.33	274	224	-	-
4363				_	_	_	_	_	_	2	_	0.16	200	190	-	-
4544	-	7.9	0.63	_			_	. –	_	8	_	0.16	253	288	_	_
4571	-	7.8	2.50					397	38	225	<.01	21	397	501	1110	1590
4828	25/7/79	7.2	0.18	165	22	135	5.5	195	18	165	<0.1	9.3	195	376	855	985
4988	25/7/79	7.5	0.11	115	21	48		-	50	26	0.1	7.7	273	355	485	685
5125	22/6/77	8.3	0.25	115	16	15	1.2	273		20	0.1	<0.1	236	212	289	409
5140	22/6/77	8.0	0.50	46	24	11	1.0	236	4					172	482	800
5179	28/7/77	7.9	1.0	35	21	109	1.5	280	3	80	0.4	<0.1	280		402	- 000
5260	2/8/67	7.2	0.15	-	-	-	-	- 004	- 04	353	- 01		422	930		840
6282	8/8/78	7.3	<0.05	128	30	22	1.9	294	84	35	0.1	1.4	294	444	750	
8015	18/7/79	8.1	0.07	21	9	87	1.8	172	4	71	0.4	<0.1	172	87	355	550 401
8808	18/7/79	7.9	0.78	49	17	16	0.7	225	1	<1	0.1	<0.1	225	192	260	
8820	4/7/79	7.7	3.8	103	16	9	1.4	246	68	12	0.1	<0.1	246	324	410	590
8987	4/7/79	8.0	.08	64	17	4	1.0	208	18	2	0.1	3.5	208	230	285	440
9071	4/7/79	7.8	1.88	62	8	4	1.3	180	16	1	0.1	<0.1	180	188	235	360
9125	20/11/72	8.0	0.70	145	-	-	-	-	-	2	-	<0.01	202	208	210	368
9913	25/7/79	7.4	<0.5	115	20	6	1.6	275	33	24	<0.1	10	275	372	430	700
11374	4/7/79	7.7	0.98	65	18	6	1.3	227	18	2	0.1	<0.1	227	236	285	450
11430	8/8/78	7.6	< 0.05	83	25	4	2.1	261	52	2	0.1	0.3	261	310	460	550
11580	3/9/69	7.0	0.95	144	-	14	2.8	-	-	14	-	-	421	454	-	-
11782	10/8/78	7.8	0.11	73	18	6	1.7	264	41	9	0.1	1.3	264	256	400	460
12583	4/7/79	7.8	0.83	54	17	4	1.4	197	16	ব	0.1	<0.1	197	204	255	390
13012	4/7/79	7.9	1.5	53	20	6	1.4	216	13	2	0.1	<0.1	216	216	265	425
13554	4/7/79	7.9	1.07	44	17	19	1.2	200	2	15	0.2	<0.1	200	180	265	410

Table 3. Inorganic Chemical Analyses - Bedrock Wells (sample locations shown on Map 3135-5)

Sample	Sampling	pH			Cons	stituents	s in millig	rams per lit	tre (mg/L	.)			Total Alkalinity ( as mg/L CaCO <sub>3</sub> )	Total	Total Dissolved Solids (mg/L )	Specific Conductance in Lab ( µ mho/cm at 25° C )
Number	Date	in Lab	Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate ( as CaCO <sub>3</sub> )	Sulphate (SO <sub>4</sub> )	Chloride (CI)	Fluoride (F)	Nitrate ( NO <sub>2</sub> + NO <sub>3</sub> as N )		( as mg/L CaCO <sub>3</sub> )		
422	14/2/65	7.4	1.9	-	-	-	-	-	87	4	-	-	233	312	-	-
2559	20/6/79	7.7	0.19	52	31	13	2.7	244	31	5	0.3	0.5	244	254	305	500
4106	10/8/78	7.8	0.1	73	24	14	1.1	201	55	19	0.1	3.8	201	282	475	530
4232	14/6/65	7.4	26.0	-	-	-	-	-	-	88	0.1	-	658	422	-	-
6822	18/7/79	7.7	0.15	74	19	225	11.1	216	36	350	0.5	1.6	216	264	935	1590
9136	18/7/79	7.9	1.10	35	22	190	8.8	265	6	227	0.7	<0.1	265	180	700	1220
10017	20/6/79	7.9	0.63	37	27	21	2.5	208	3	23	0.2	<0.1	208	202	270	465
10524	20/6/79	7.5	<.05	136	50	110	9.5	342	46	252	0.1	1.9	342	536	1250	2700
12878	18/7/79	8.1	0.28	37	12	285	16.0	129	34	441	0.9	<0.1	129	144	950	1690

## **DESCRIPTIVE NOTES**

The inorganic chemical quality of ground water at locations in the study area can be estimated by inspecting the analyses of nearby ground-water samples. Analyses of the samples are shown in tables 1, 2, and 3; locations of the samples are shown on maps 3135-1, 3135-3, and 3135-5. The samples were taken from selected overburden and bedrock wells and indicate quality of ground water in the common water-bearing zones in different parts of the study area.

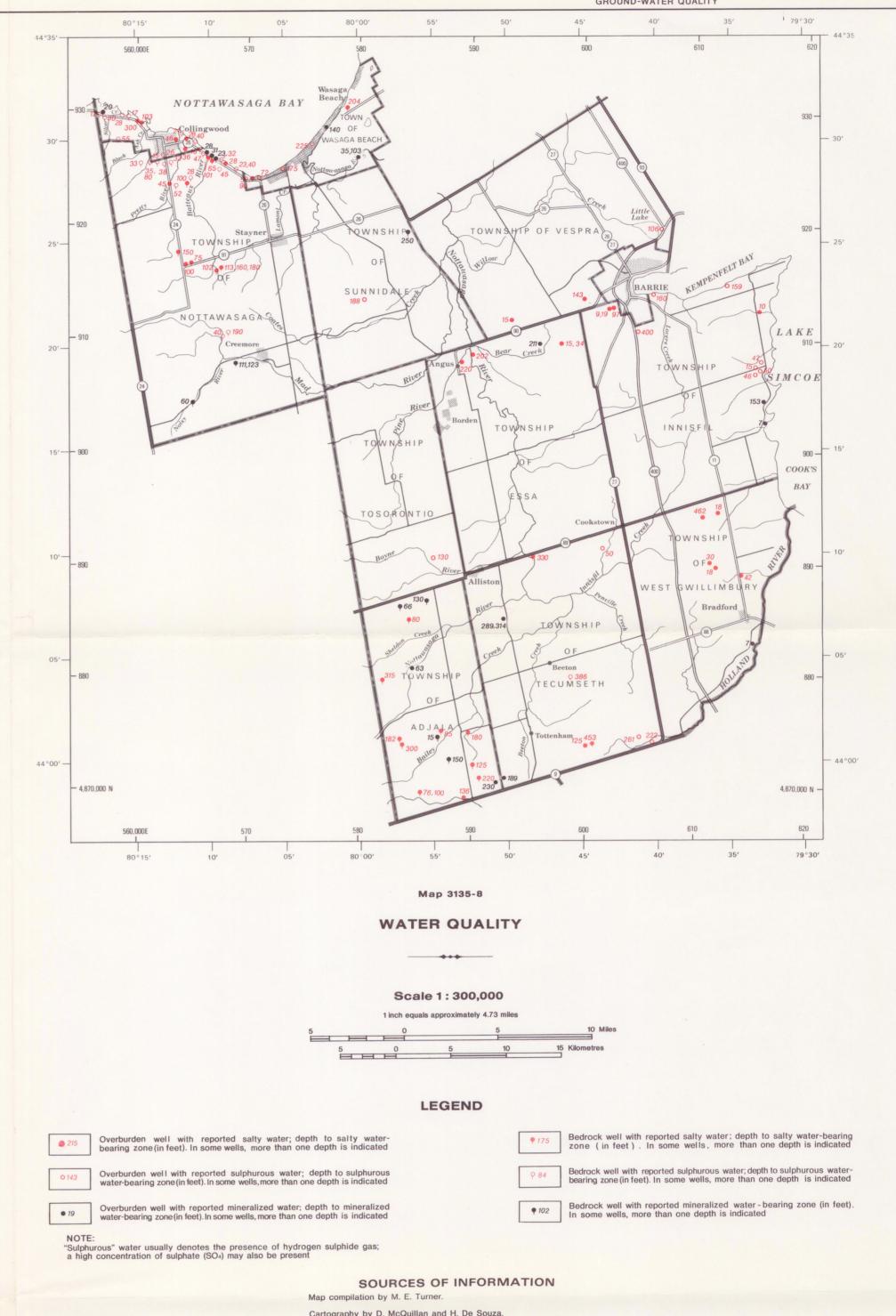
Table 4 summarizes water-quality criteria from the publication: "Water Management – Goals, Policies, Objectives, and Implementation Procedures of the Ministry of the Environment, 1978." These criteria are maximum concentrations recommended for drinking water supplies and for agricultural uses. While the criteria generally should be adhered to, slight excesses are usually not beautiful. In cases where quality of the water supply is in doubt harmful. In cases where quality of the water supply is in doubt, local health authorities should be consulted.

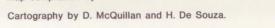
## WATER QUALITY-SUMMARY

Of the wells sampled in the southern portion of the County of Simcoe, 12 percent have salty water (chloride content over 250 mg/L), 6 percent have high concentrations of nitrate and nitrite. ( $NO_2 + NO_3$  over 10 mg/L), 45 percent have high concentrations (NO2 + NO3 over 10 mg/L), 45 percent have high concentrations of iron (over 0.3 mg/L) and 13 percent have very hard water (over 400 mg/L CaCO<sub>3</sub>). Most salty (and sulphurous) water wells are those drilled close to or into the shales of the Queenston, Georgian Bay, Whitby and Verulam formations at Collingwood and in the Township of Adjala in the southwestern portion of the map area. High concentrations of iron and calcium carbonate (CaCO<sub>3</sub>) are found in wells throughout the study area and show no obvious patterns of occurrence.

## **Table 4. Water Quality Parameters**

Substance	Significance	Drinking Water Quality Criteria	Agricultural Water Quality Criteria	
Iron	Iron in excessive concentrations will precipitate after exposure to air, which causes turbidity, stains plumbing fixtures, laundry and cooking utensils, and imparts objectionable tastes and colours to foods and drinks.	0.3 mg/L*	not specified	
Hardness (Calcium, Magnesium)	Consumes soap before a lather will form. Hard water forms scale in water heaters and pipes. Waters of hardness greater than 180 mg/L are classified as very hard.	not specified	not specified	
Sodium, Potassium	Large amounts in combination with chloride give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. A high sodium content may limit the use of water for irrigation and in some instances for domestic consumptive uses.	not specified	not specified	
Sulphate	In large amounts, sulphate can have laxative effects on unaccustomed users and in combination with other ions, gives a bitter taste to water.	250 mg/L	not specified	
Chloride	In large amounts and in combination with sodium, chloride gives water a salty taste and increases the corrosiveness of water.	250 mg/L	not specified	
Fluoride	In large amounts, fluoride can disfigure teeth by mottling the enamel. However, in more desirable amounts (1.0 mg/L), fluoride has been found to inhibit tooth decay.	2.4 mg/L	2.0 mg/L	
Nitrate	Concentration much greater than the natural regional background may suggest pollution. Waters of high nitrate content cause methemoglobinemia (an often fatal infant disease) and therefore should not be used in infant feeding. Nitrate encourages the growth of algae and other organisms that produce undesirable tastes and odours.	10 mg/L	100 mg/L**	
Dissolved Solids	High dissolved solids may often suggest that criteria of one or more substances have been exceeded.	500 mg/L	3000 mg/L	





Geologic information was derived from water-well records on file with the Ontario Ministry of the Environment up to February, 1978.

Base map was derived from 1:25,000 and 1:50,000 sheets of the National

**MOE 2224** 



MINISTRY OF THE ENVIRONMENT

Water Resources Branch

**COUNTY OF SIMCOE** (Southern Portion)

Map 3135

**GROUND-WATER PROBABILITY** 

SHEET 4

**GROUND-WATER QUALITY**